Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_

**More Hardy Weinberg Practice Problems**

Mrs. Krouse, 2015-2016

***Calculations:*** *Determine the correct value for each scenario given below. Show all your work, and use the following equations to help you.*

|  |  |
| --- | --- |
| Allele Frequencies | p + q = 1 |
| Genotype Frequencies | p2 + 2pq + q2 = 1 |

1. A very large population of randomly-mating laboratory mice contains 25% white mice. White coloring is caused by the double recessive genotype, "aa". Calculate the frequency of the dominant allele.
2. Given: q2 = 0.25
3. Find: p
4. Calculations:

q2 = 0.25 🡪 q = 0.5

p + q = 1 🡪 p = 1-q = 1-0.5 = **0.5**

1. The allele for a widow's peak (hairline) is dominant over the allele for a straight hairline. In a population of 500 individuals, 9% show the recessive phenotype. How many individuals would you expect to be heterozygous for the trait?
2. Given: q2 = 0.09
3. Find: 2pq x 500
4. Calculations:

q2 = 0.09 🡪 q = 0.3

p + q = 1 🡪 p = 1-q = 1-0.3 = 0.7

2pq x 500 = [(2)(0.7)(0.3) x 500] = **210 individuals**

1. Let’s say that brown fur coloring is dominant to gray fur coloring in mice. If you have 168 brown mice in a population of 200 mice then what is the frequency of the homozygous recessive genotype.
2. Given: p2 + 2pq = 168/200… but we can’t use this. However, if there are 168 mice with the dominant phenotype out of 200, that means there are 32 mice with the recessive phenotype (i.e. 200-168 = 32).

So… q2 = 32/200 = 0.16

1. Find: q2
2. Calculations:

Oh my gosh, we already found q2 while identifying our given information! Hooray! q2 = **0.16**

1. A rather large population of Doodle bugs 396 red-sided individuals and 557 tan-sided individuals. Assume that red is totally recessive. How many individuals have a homozygous dominant genotype?
2. Given: q2 = 396/(396+557) = 396/953= 0.416
3. Find: p2 x 953
4. Calculations:

q2 = 0.416 🡪 q = 0.645

p + q = 1 🡪 p = 1-q = 1-0.645 = 0.355

p2 x 953 = [(0.355)2 x 953] = **120 individuals**

1. A Pangorian trait which results from simple Mendelian inheritance is antenna shape. Corkscrew antennae (A) are dominant over straight antennae (a). When the entire Pangorian population was screened (all 9,904 of them), 3,565 had corkscrew, while the rest had straight antennae. What is the frequency of the dominant allele?
2. Given: p2 + 2pq = 3565/9904…but we can’t use this. However, if there are 3565 Pangorians with the dominant phenotype out of 9904, that means there are 6339 Pangorians with the recessive phenotype (i.e. 9904-3565 = 6339).

So… q2 = 6339/9904 = 0.64

1. Find: p
2. Calculations:

q2 = 0.64 🡪 q = 0.8

p + q = 1 🡪 p = 1-q = 1-0.8 = **0.2**